

CHAPTER 2

DESCRIPTION OF THE FORT LOUDOUN LAKE WATERSHED

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2.1. BACKGROUND. The Fort Loudoun Lake Watershed contains Fort Loudoun Dam, the uppermost dam on the Tennessee River. The dam received its name from a British fort that was built near the present site of the dam during the French and Indian War. The fort was named in honor of John Campbell, 4th Earl of Loudoun, who was the commander-in-chief of the British forces in North America. Fort Loudoun Reservoir was created by the damming of the Tennessee River, and is a popular site for fishing and boating.

The watershed is characterized by forested slopes, high gradient, cool, clear streams, and rugged terrain. Some of the lower stream reaches occur on limestone. The chemistry of the streams flowing down the sandstone ridges can vary greatly depending on the geologic material. Some of the watershed's streams flow through the Blue Ridge Mountains, and have a distinct fauna, some containing brook trout, the only salmonid native to Tennessee.

This Chapter describes the location and characteristics of the Fort Loudoun Lake Watershed.

2.2. DESCRIPTION OF THE WATERSHED.

2.2.A. General Location. Located in East Tennessee, the Fort Loudoun Lake Watershed includes parts of Blount, Knox, Loudon, and Sevier Counties.

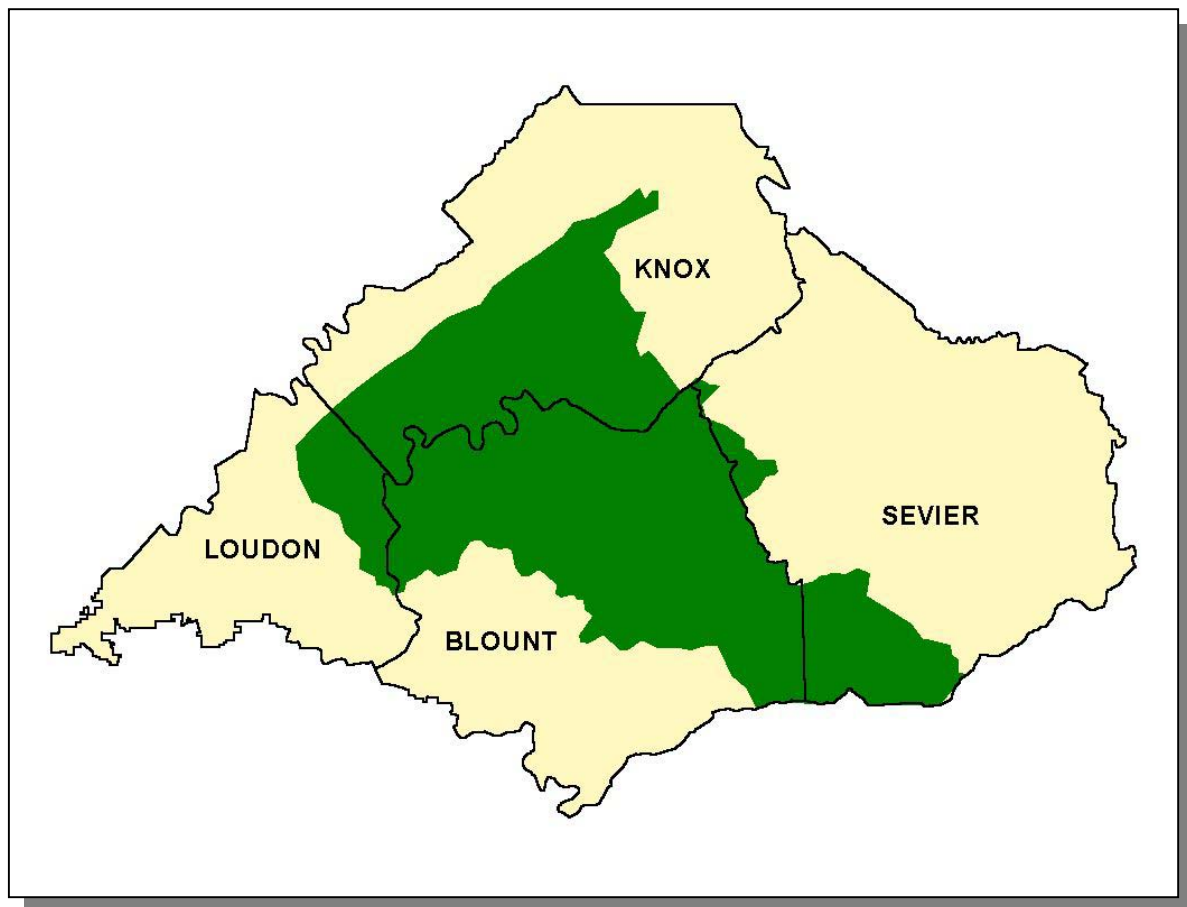


Figure 2-1. General Location of the Fort Loudoun Lake Watershed.

| COUNTY | % OF WATERSHED IN EACH COUNTY |
|--------|-------------------------------|
| Blount | 51.5 |
| Knox | 29.7 |
| Sevier | 12.4 |
| Loudon | 6.4 |

Table 2-1. The Fort. Loudoun Lake Watershed Includes Parts of Four East Tennessee Counties.

2.2.B. Population Density Centers. One interstate and eight state highways serve the major communities in the Fort Loudoun Lake Watershed.

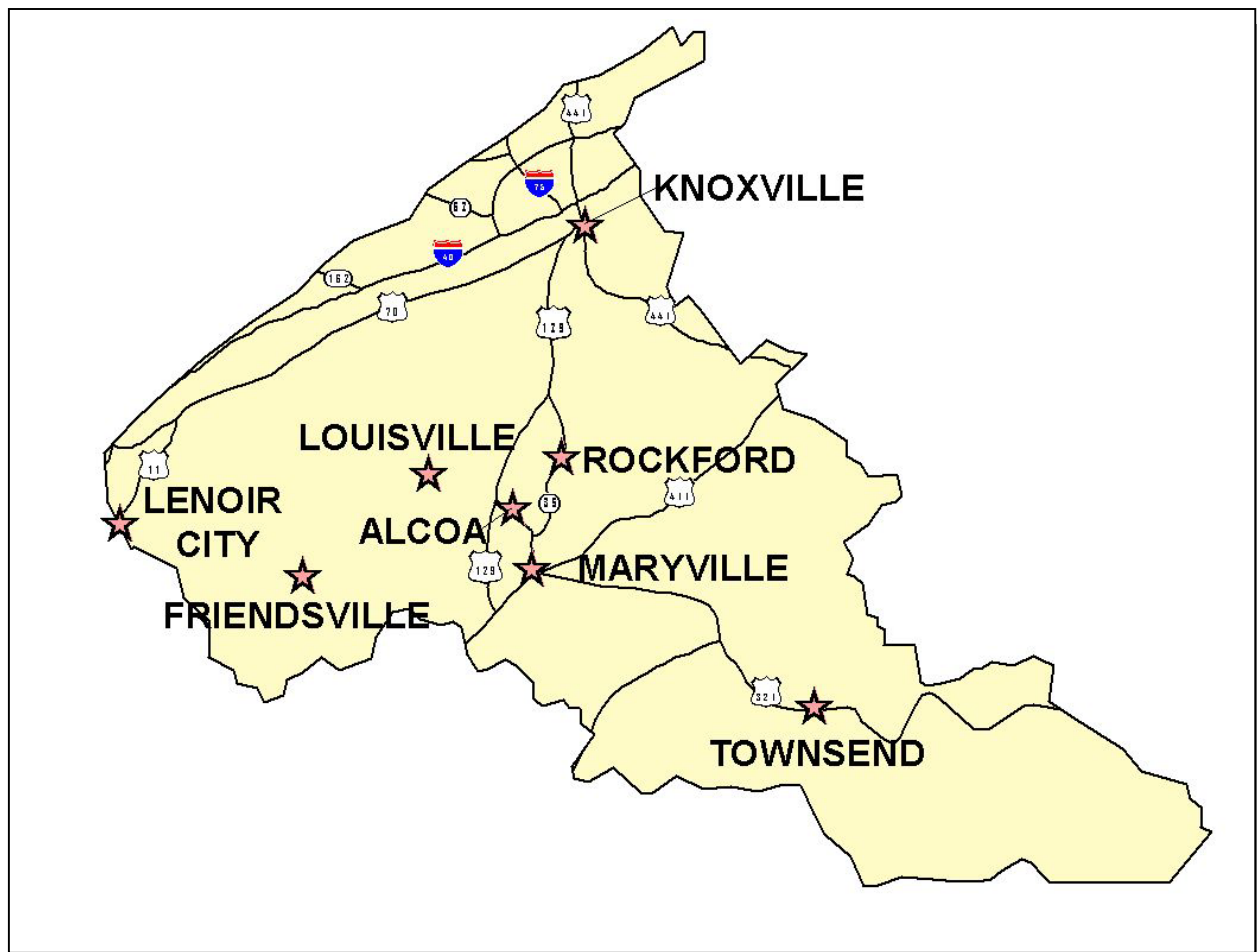


Figure 2-2. Municipalities and Roads in the Fort. Loudoun Lake Watershed.

| MUNICIPALITY | POPULATION | COUNTY |
|--------------|------------|--------|
| Knoxville* | 167,535 | Knox |
| Maryville* | 23,042 | Blount |
| Lenoir City | 8,890 | Loudon |
| Alcoa | 7,137 | Blount |
| Louisville | 986 | Blount |
| Friendsville | 950 | Blount |
| Rockford | 746 | Blount |
| Townsend | 426 | Blount |

Table 2-2. Municipalities in the Fort Loudoun Lake Watershed. Population based on 1996 census (Tennessee Blue Book). Asterisk (*) indicates county seat.

2.3. GENERAL HYDROLOGIC DESCRIPTION.

2.3.A. Hydrology. The Fort Loudoun Lake Watershed, designated 06010201 by the USGS, is approximately 638 square miles and empties to the Tennessee River.

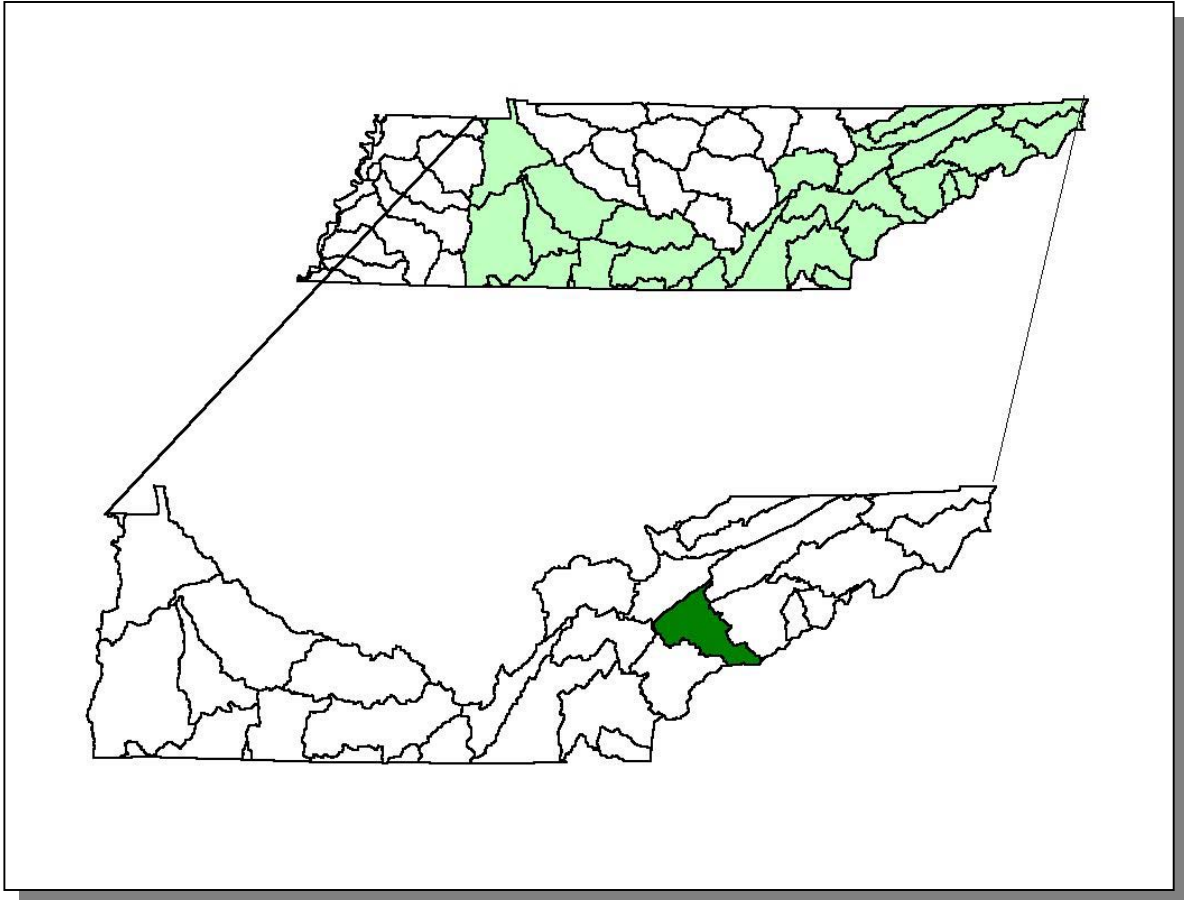


Figure 2-3. The Fort Loudoun Lake Watershed is Part of the Tennessee River Basin.

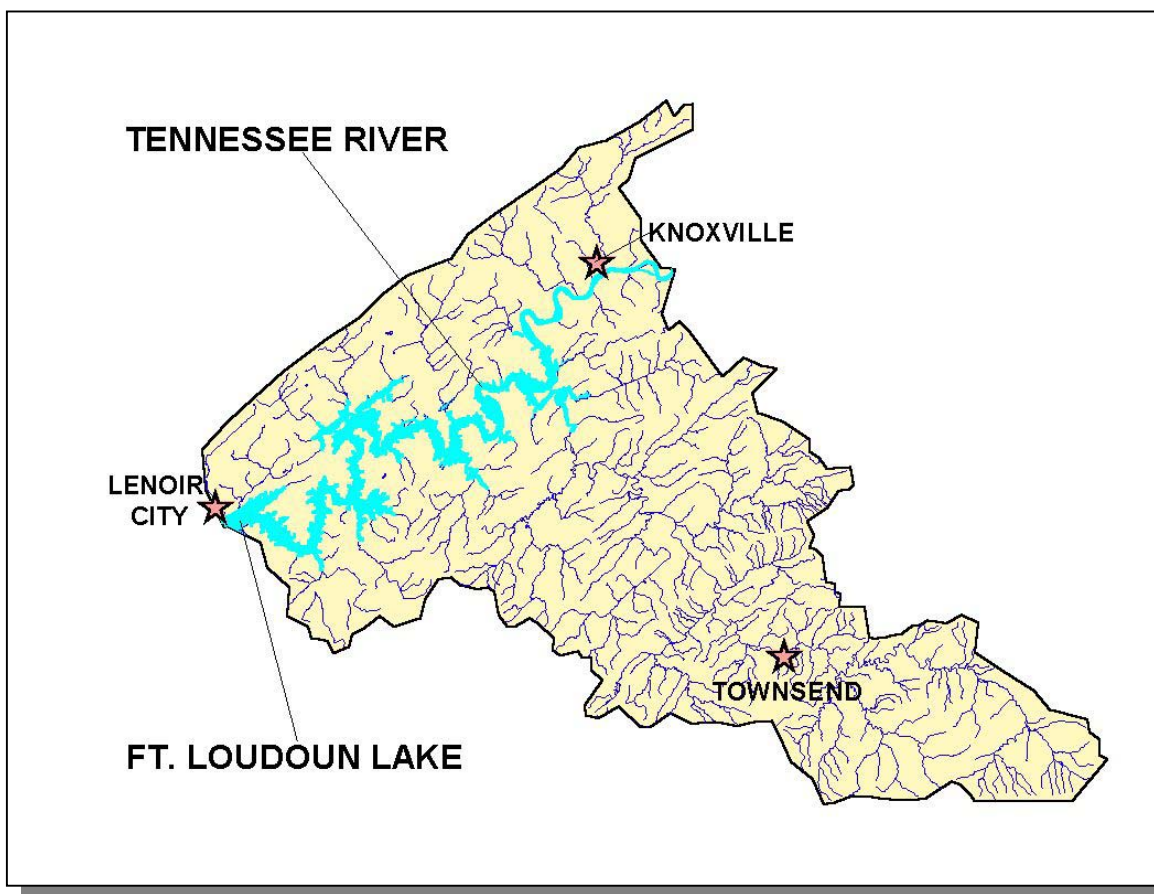


Figure 2-4. Hydrology in the Fort Loudoun Lake Watershed. There are 911 stream miles and 14,600 lake acres recorded in River Reach File 3 in the Fort Loudoun Lake Watershed. Locations of Tennessee River and Fort Loudoun Lake and the cities of Knoxville, Lenoir City, and Townsend are shown for reference.

2.3.B. Dams. There are 7 dams inventoried by TDEC Division of Water Supply in the Fort Loudoun Lake Watershed. These dams either retain 30 acre-feet of water or have structures at least 20 feet high.

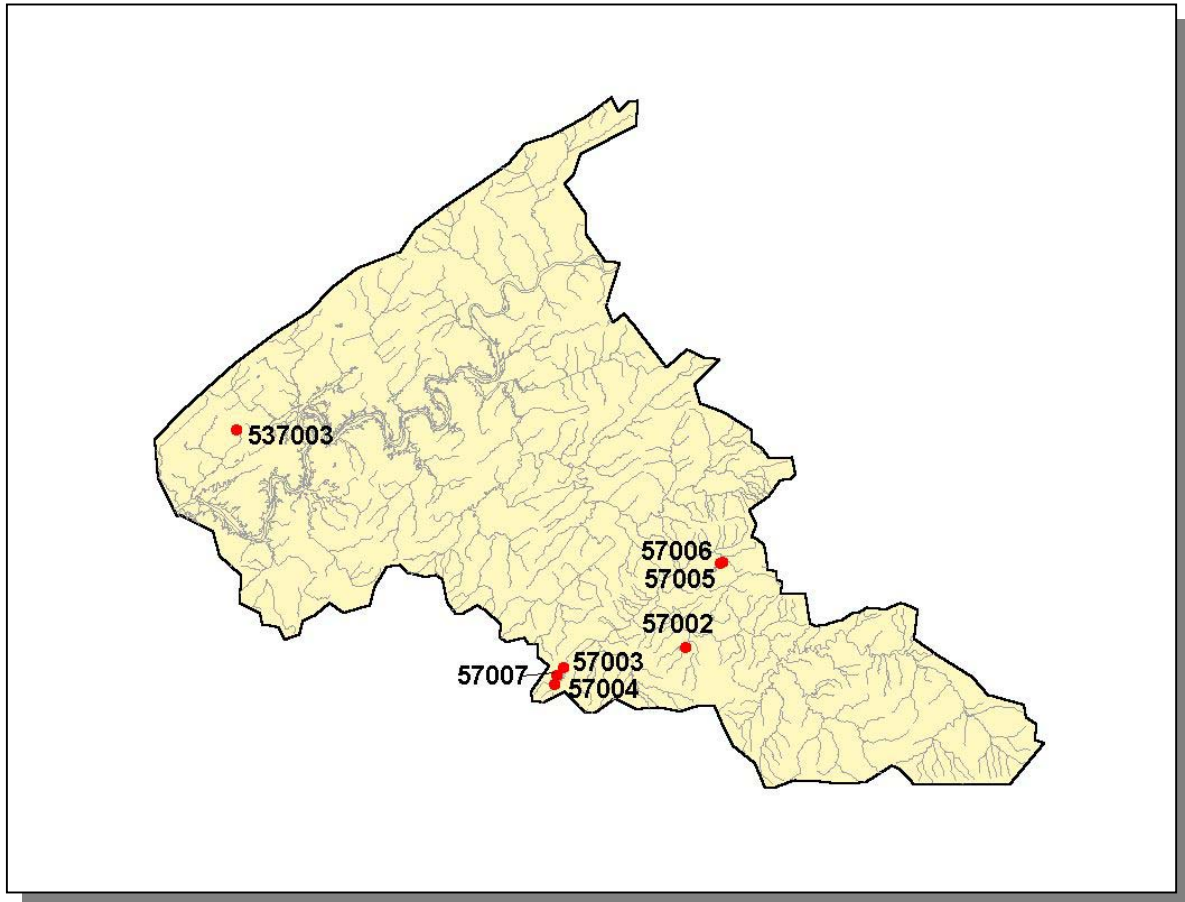


Figure 2-5. Location of Inventoried Dams in the Fort Loudoun Lake Watershed. More information is provided in Fort Loudoun-Appendix II and on the TDEC homepage at: <http://gwidc.gwi.memphis.edu/website/dams/viewer.htm>

2.4. LAND USE. Land Use/Land Cover information was provided by EPA Region 4 and was interpreted from 1992 Multi-Resolution Land Cover (MRLC) satellite imagery.

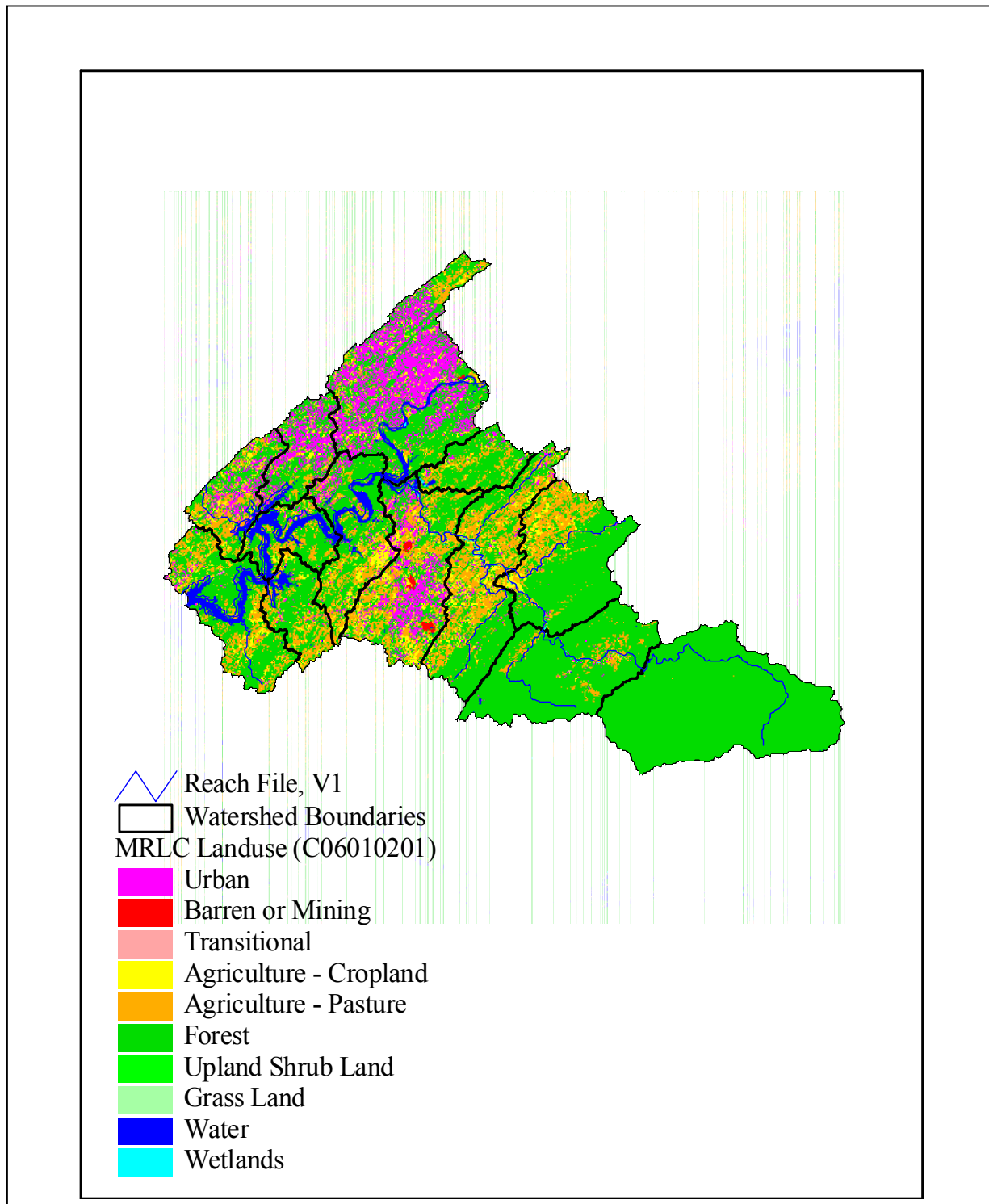


Figure 2-6. Illustration of Select Land Cover/Land Use Data from MRLC Satellite Imagery.

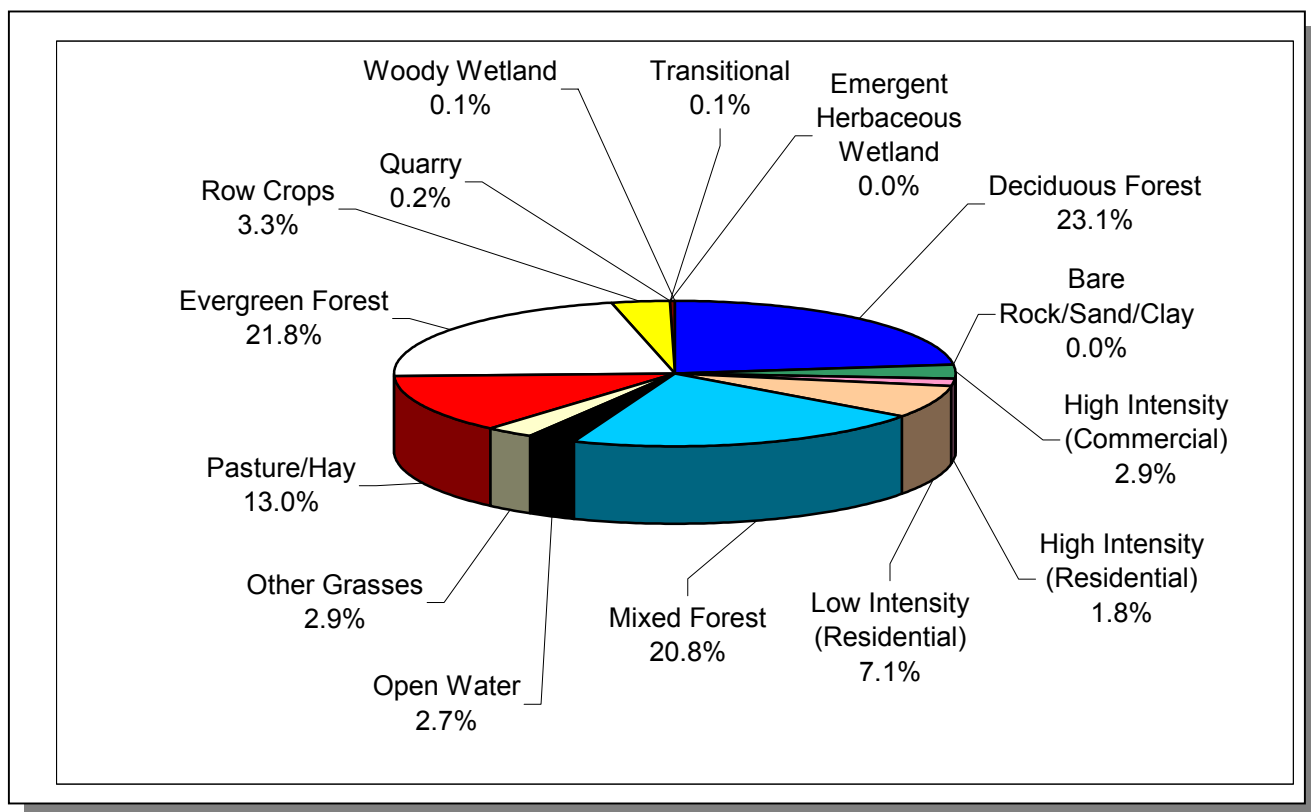


Figure 2-7. Land Use Distribution in the the Fort Loudoun Lake Watershed. More information is provided in Fort Loudoun-Appendix II.

2.5. ECOREGIONS AND REFERENCE STREAMS. Ecoregions are defined as relatively homogeneous areas of similar geography, topography, climate and soils that support similar plant and animal life. Ecoregions serve as a spatial framework for the assessment, management, and monitoring of ecosystems and ecosystem components. Ecoregion studies include the selection of regional stream reference sites, identifying high quality waters, and developing ecoregion-specific chemical and biological water quality criteria.

There are eight Level III Ecoregions and twenty-five Level IV subecoregions in Tennessee. The Fort Loudoun Lake Watershed lies within 2 Level III ecoregions (Blue Ridge Mountains, Ridge and Valley) and contains 7 Level IV subecoregions (Griffen, Omernik, Azavedo):

- The Southern Sedimentary Ridges (66e) in Tennessee include some of the westernmost foothill areas of the Blue Ridges Mountains ecoregion, such as the Bean, Starr, Chilhowee, English, Stone, Bald, and Iron Mountain areas. Slopes are steep, and elevations are generally 1000-4500 feet. The rocks are primarily Cambrian-age sedimentary (shale, sandstone, siltstone, quartzite, conglomerate), although some lower stream reaches occur on limestone. Soils are predominantly friable loams and fine sandy loams with variable amounts of sandstone rock fragments, and support mostly mixed oak and oak-pine forests.
- Limestone Valleys and Coves (66f) are small but distinct lowland areas of the Blue Ridge, with elevations mostly between 1500 and 2500 feet. About 450 million years ago, older Blue Ridge rocks to the east were forced up and over younger rocks to the west. In places, the Precambrian rocks have eroded through to Cambrian or Ordovician-age limestones, as seen especially in isolated, deep cove areas that are surrounded by steep mountains. The main areas of limestone include the Mountain City lowland area and Shady Valley in the north; and Wear Cove, Tuckaleechee Cove, and Cades Cove of the Great Smoky Mountains in the south. Hay and pasture, with some tobacco patches on small farms, are typical land uses.
- The Southern Metasedimentary Mountains (66g) are steep, dissected, biologically-diverse mountains that include Clingmans Dome (6643 feet), the highest point in Tennessee. The Precambrian-age metamorphic and sedimentary geologic materials are generally older and more metamorphosed than the Southern Sedimentary Ridges (66e) to the west and north. The Appalachian oak forests and, at higher elevations, the northern hardwoods forests include a variety of oaks and pines, as well as silverbell, hemlock, yellow poplar, basswood, buckeye, yellow birch, and beech. Spruce-fir forests, found generally above 5500 feet, have been affected greatly over the past twenty-five years by the balsam woolly aphid. The Copper Basin, in the southeast corner of Tennessee, was the site of copper mining and smelting from the 1850's to 1987, and once left more than fifty square miles of eroded earth.

- The Southern Limestone/Dolomite Valleys and Low Rolling Hills (67f) form a heterogeneous region composed predominantly of limestone and cherty dolomite. Landforms are mostly low rolling ridges and valleys, and the solids vary in their productivity. Landcover includes intensive agriculture, urban and industrial, or areas of thick forest. White oak forests, bottomland oak forests, and sycamore-ash-elm riparian forests are the common forest types, and grassland barrens intermixed with cedar-pine glades also occur here.
- The Southern Shale Valleys (67g) consist of lowlands, rolling valleys, and slopes and hilly areas that are dominated by shale materials. The northern areas are associated with Ordovician-age calcareous shale, and the well-drained soils are often slightly acid to neutral. In the south, the shale valleys are associated with Cambrian-age shales that contain some narrow bands of limestone, but the soils tend to be strongly acid. Small farms and rural residences subdivide the land. The steeper slopes are used for pasture or have reverted to brush and forested land, while small fields of hay, corn, tobacco, and garden crops are grown on the foot slopes and bottomland.
- The Southern Sandstone Ridges (67h) ecoregion encompasses the major sandstone ridges, but these ridges also have areas of shale and siltstone. The steep, forested chemistry of streams flowing down the ridges can vary greatly depending on the geologic material. The higher elevation ridges are in the north, including Wallen Ridge, Powell Mountain, Clinch Mountain, and Bays Mountain. White Oak Mountain in the south has some sandstone on the west side, but abundant shale and limestone as well. Grindstone Mountain, capped by the Gizzard Group sandstone, is the only remnant of Pennsylvanian-age strata in the Ridge and Valley of Tennessee.
- The Southern Dissected Ridges and Knobs (67i) contain more crenulated, broken, or hummocky ridges, compared to smoother, more sharply pointed sandstone ridges. Although shale is common, there is a mixture and interbedding of geologic materials. The ridges on the east side of Tennessee's Ridge and Valley tend to be associated with the Ordovician-age Sevier shale, Athens shale, and Holston and Lenoir limestones. These can include calcareous shale, limestone, siltstone, sandstone, and conglomerate. In the central and western part of the ecoregion, the shale ridges are associated with the Cambrian-age Rome Formation: shale and siltstone with beds of sandstone. Chestnut oak forests and pine forests are typical for the higher elevations of the ridges, with areas of white oak, mixed mesophytic forest, and tulip poplar on the lower slopes, knobs, and draws.

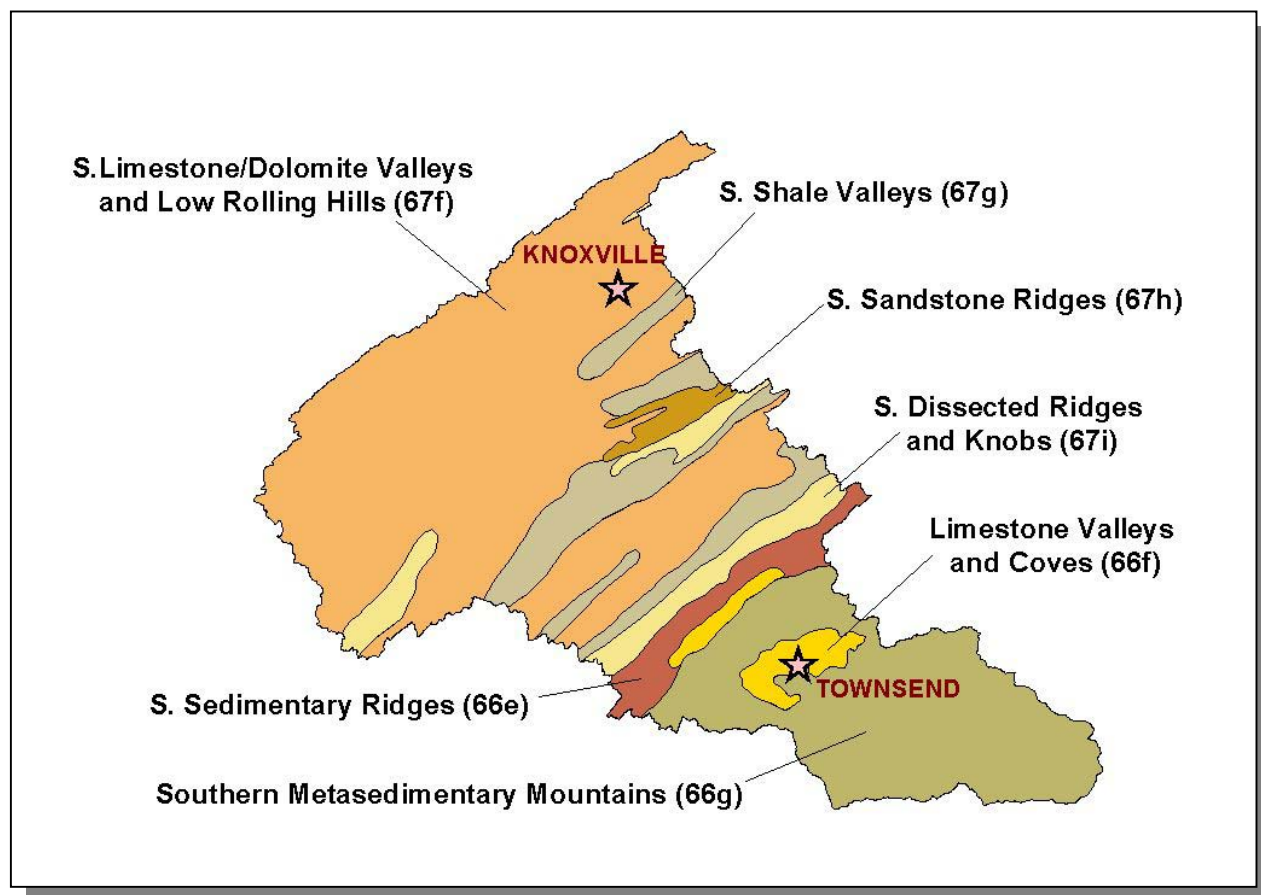


Figure 2-8. Level IV Ecoregions in the Fort Loudoun Lake Watershed. Locations of Knoxville, Lenoir City, and Townsend are shown for reference.

Each Level IV Ecoregion has at least one reference stream associated with it. A reference stream represents a least impacted condition and may not be representative of a pristine condition.

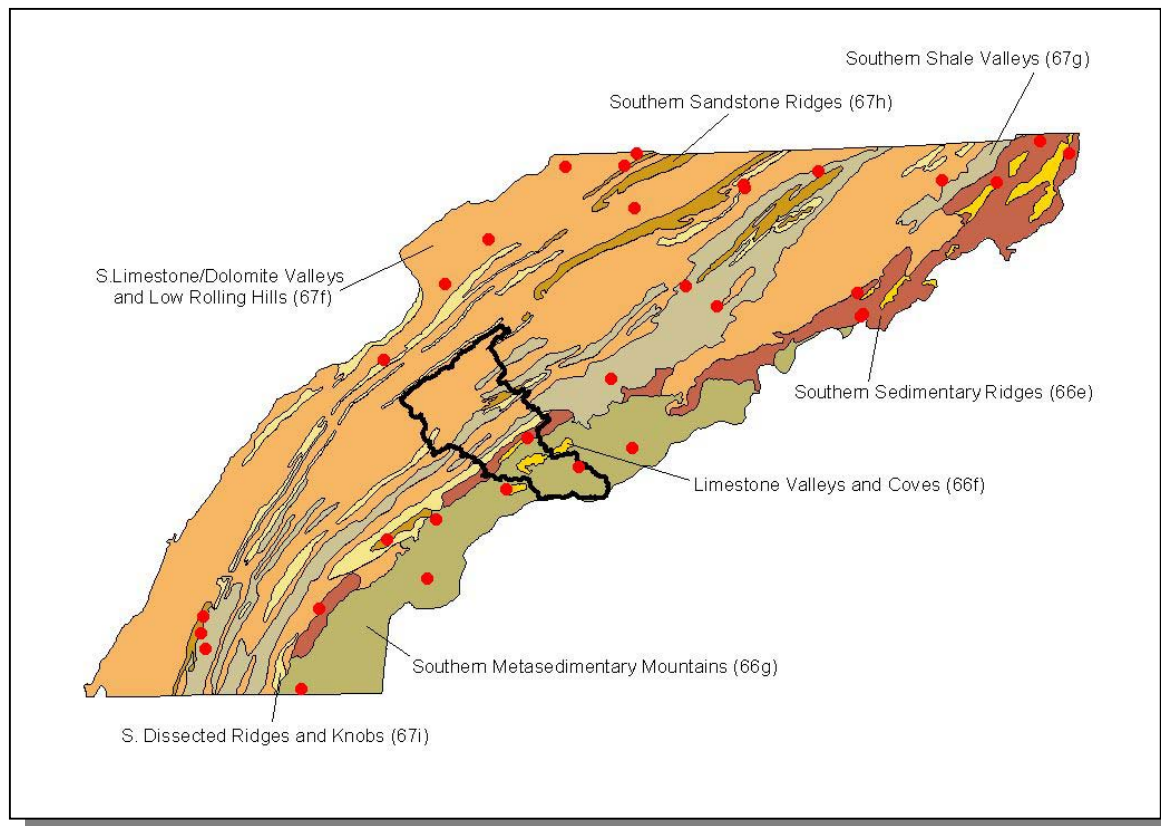


Figure 2-9. Tennessee Ecoregion Monitoring Sites in Level IV Ecoregions 66e, 66f, 66g, 67f, 67g, 67h, and 67i. The Fort Loudoun Lake Watershed is shown for reference. More information is provided in Fort Loudoun-Appendix II.

2.6. NATURAL RESOURCES.

2.6.A. Rare Plants and Animals. The Heritage Program in the TDEC Division of Natural Heritage maintains a database of rare species that is shared by partners at The Nature Conservancy, Tennessee Wildlife Resources Agency, the US Fish and Wildlife Service, and the Tennessee Valley Authority. The information is used to: 1) track the occurrence of rare species in order to accomplish the goals of site conservation planning and protection of biological diversity, 2) identify the need for, and status of, recovery plans, and 3) conduct environmental reviews in compliance with the federal Endangered Species Act.

| GROUPING | NUMBER OF RARE SPECIES |
|--------------|------------------------|
| Crustaceans | 0 |
| Insects | 0 |
| Mussels | 7 |
| Snails | 6 |
| | |
| Amphibians | 2 |
| Birds | 8 |
| Fish | 10 |
| Mammals | 6 |
| Reptiles | 0 |
| | |
| Plants | 51 |
| | |
| Total | 90 |

Table 2-3. There are 90 Rare Plant and Animal Species in the Fort Loudoun Lake Watershed.

In the Fort Loudoun Lake Watershed, there are ten rare fish species, seven rare mussel species, and six rare snail species.

| SCIENTIFIC NAME | COMMON NAME | FEDERAL STATUS | STATE STATUS |
|--------------------------------|-------------------------------|----------------|--------------|
| <i>Acipenser fulvescens</i> | Lake sturgeon | MC | E |
| <i>Cyprinella monacha</i> | Spotfin chub | LT | T |
| <i>Phoxinus sp 1</i> | Laurel dace | | E |
| <i>Cycleptus elongatus</i> | Blue sucker | MC | T |
| <i>Noturus flavipinis</i> | Yellowfin madtom | LT | E |
| <i>Etheostoma cinereum</i> | Ashy darter | MC | T |
| <i>Etheostoma percnurum</i> | Duskytail darter | LE | E |
| <i>Percina burtoni</i> | Blotchside darter | MC | D |
| <i>Percina macrocephala</i> | Longhead darter | | T |
| <i>Percina tanasi</i> | Snail darter | LT | T |
| | | | |
| <i>Cyprogenia irrorata</i> | Eastern fanshell pearlymussel | LE | E |
| <i>Dromus dromas</i> | Dromedary pearlymussel | LE | E |
| <i>Fusconaia edgariana</i> | Shiny pigtoe | LE | E |
| <i>Fusconaia cuneolus</i> | Fine-rayed pigtoe | LE | E |
| <i>Lampsilis abrupta</i> | Pink mucket | LE | E |
| <i>Conradilla caelata</i> | Birdwing pearl mussel | LE | E |
| <i>Plethobasus cooperianus</i> | Orange-foot pimpleback | LE | E |
| | | | |
| <i>Paravitrea clappi</i> | Mirey ridge supercoil | | |
| <i>Pilsbryna aurea</i> | Ornate bud | | |
| <i>Mesodon jonesianus</i> | Big-toothed covert | | |
| <i>Io fluviatilis</i> | Spiny riversnail | | |
| <i>Athearnia anthonyi</i> | Anthony's riversnail | LE | E |
| <i>Lithasia geniculata</i> | Ornate rocksnail | | |

Table 2-4. Rare Aquatic Species in the Fort Loudoun Lake Watershed. Federal Status: LE, Listed Endangered by the U.S. Fish and Wildlife Service, LT, Listed Threatened by the U.S. Fish and Wildlife Service, MC, Management Concern for the U.S. Fish and Wildlife Service. State Status: E, Listed Endangered by the Tennessee Wildlife Resources Agency; D, Deemed in Need of Management by the Tennessee Wildlife Resources Agency, T, Listed Threatened by the Tennessee Wildlife Resources Agency. More information may be found at <http://www.state.tn.us/environment/nh/tnanimal.html>

2.6.B. Wetlands. The Division of Natural Heritage maintains a database of wetland records in Tennessee. These records are a compilation of field data from wetland sites inventoried by various state and federal agencies. Maintaining this database is part of Tennessee's Wetland Strategy, which is described at <http://www.state.tn.us/environment/epo/wetlands/strategy.zip>.

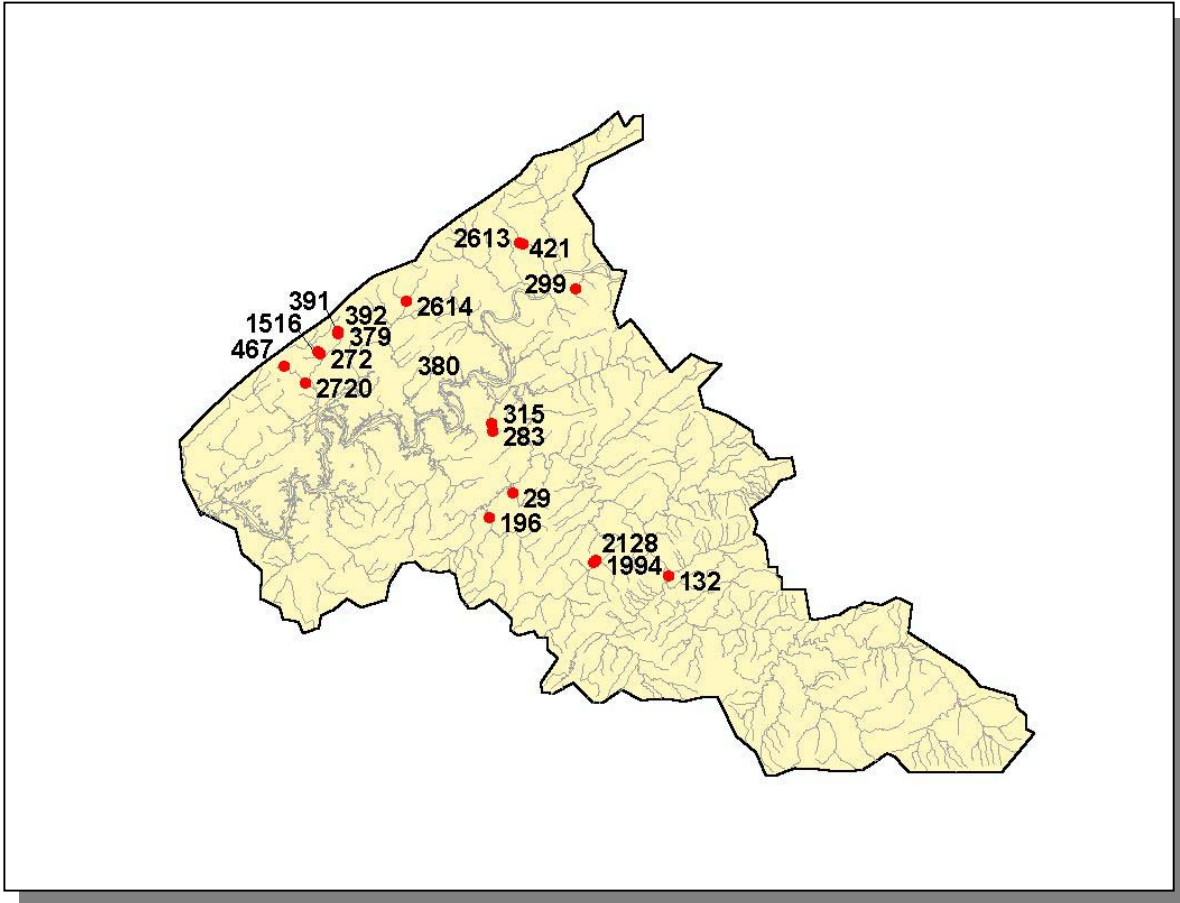


Figure 2-10. Location of Wetland Sites in TDEC Division of Natural Heritage Database in the Fort Loudoun Lake Watershed. This map represents an incomplete inventory and should not be considered a dependable indicator of the presence of wetlands. There may be additional wetland sites in the watershed. More information is provided in Fort Loudoun-Appendix II.

2.7. CULTURAL RESOURCES.

2.7.A. Greenways. In 1997, Knoxville was named Greenway City of the Year by National Geographic Society. The city's 20.75 miles of paved greenway include 15 trails. The Maryville Greenway Trail is a well-lit, picturesque walking path of 4 miles.

2.7.B. Interpretive Areas. Some sites representative of the cultural heritage are under state or federal protection:

- House Mountain State Park, a 500 acre park with hiking trails
- Ijams Nature Center, a public park and environmental education center with trails overlooking the Tennessee River
- Great Smoky Mountains National Park, world renowned for the diversity of its plant and animal resources
- Marble Springs, state-owned historic plantation home of John Sevier, an early Tennessee politician

In addition, many local interpretive areas are common, most notably, Island Home Park in Knoxville and Maryville's Bicentennial Park.

2.7.C. Wildlife Management Area. The Tennessee Wildlife Resources Agency manages the Cove Mountain Wildlife Management Area.

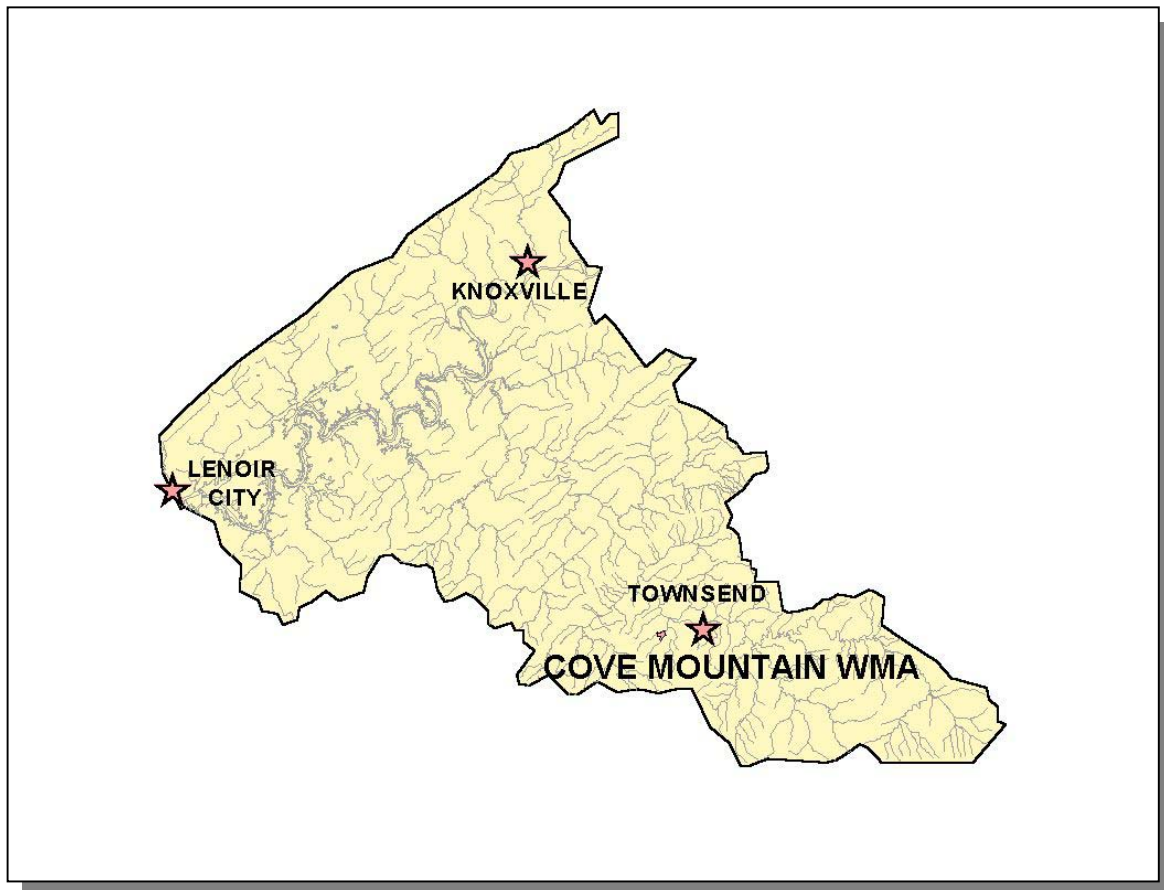


Figure 2-11. TWRA Manages Cove Mountain Wildlife Management Area in the Fort Loudoun Lake Watershed. Locations of Knoxville, Lenoir City, and Townsend are shown for reference.

2.8. TENNESSEE RIVERS ASSESSMENT PROJECT. The Tennessee Rivers Assessment is part of a national program operating under the guidance of the National Park Service's Rivers and Trails Conservation Assistance Program. The Assessment is an inventory of river resources, and should not be confused with "Assessment" as defined by the Environmental Protection Agency. A more complete description can be found in the Tennessee Rivers Assessment Summary Report, which is available from the Department of Environment and Conservation and on the web at:

<http://www.state.tn.us/environment/wpc/publications/riv/>

| STREAM | NSQ | RB | RF | STREAM | NSQ | RB | RF |
|---------------------------|-----|-----|-------|---|-----|----|----|
| Buck Creek | 3 | | 2 | Paint Rock Creek | 3 | 2 | 3 |
| Cane Creek | 1 | | | Piney Creek | 1 | 2 | 3 |
| Carr Creek | 4 | | | Piney River | 1 | | |
| Cave Creek | 3 | | 2 | Pistol Creek | 3 | | |
| Cloyd Creek | 3 | | | Pitner Creek | 3 | | |
| Crooked Creek | 3 | | | Polecat Creek | 3 | | |
| Dunlap Creek | 2 | | | Pond Cave Creek | 2 | | |
| Duskin Creek | 2 | | | Pond Creek | 4 | | 2 |
| Ellejoy Creek | 3 | | 2 | Reed Creek | 3 | | |
| Fall Creek | 1 | | 3 | Riley Creek | 3 | | 2 |
| First Creek | 4 | | | Roddy Creek | 4 | | |
| Flag Creek | 4 | | | Sandy Creek | 2 | | |
| Flat Creek | 2 | | | Second Creek | 4 | | |
| Hesse Creek | 1,3 | | | Smith Creek | 3 | | |
| Hines Creek | 3 | | | Soak Creek | 2,3 | | |
| Laurel Creek | 1 | | | Stamp Creek | 3 | | |
| Little Ellejoy Creek | 3 | | | Steekee Creek | 3 | | |
| Little Paint Rock Creek | 3 | 3 | | Sweetwater Creek | 3 | 3 | |
| Little River | 2 | 1,2 | 1,2,4 | Taylor Branch Creek | 4 | | |
| Little Turkey Creek | 4 | | | Third Creek | 4 | | |
| Mammy's Creek | 1 | 2 | | Town Creek | 4 | | |
| Middle Prong Little River | 1 | | | Tributary to Laurel Lake | 3 | | |
| Moccasin Creek | 1 | | | Turkey Creek | 3 | | 2 |
| Nails Creek | 3 | | | Unnamed tributary to Watts Bar Reservoir | 3 | | |
| North Fork Basin Creek | 2 | | | Whites Creek | 3 | 2 | |
| North Fork Turkey Creek | 3 | | | Wolf Creek | 2,4 | | 2 |

Table 2-5. Stream Scoring from the Tennessee Rivers Assessment Project.

Categories: NSQ, Natural and Scenic Qualities
RB, Recreational Boating
RF, Recreational Fishing

Scores: 1. Statewide or greater Significance; Excellent Fishery
2. Regional Significance; Good Fishery
3. Local Significance; Fair Fishery
4. Not a significant Resource; Not Assessed